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TITLE: Memory alteration system for camera and its control method

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CLAIMS:

What is claimed is:

1. A memory alteration system for a camera which comprises storage means divided into at least two areas, wherein the at least two areas of said storage means respectively are able to hold control program for altering contents of said storage means, and wherein, when the control program held in a first area is executed to alter the contents of a second area to a predetermined control program and the said first area is altered using said predetermined control program of the said second area, the contents of all the areas of said storage means are altered.
2. The system according to claim 1, wherein said storage means comprises a flash memory, which has a plurality of banks including first and second banks.
3. The system according to claim 2, wherein said plurality of banks are independently erasable and writable.
4. The system according to claim 3, wherein the control program is a loader program for controlling rewrite of said flash memory.
5. The system according to claim 4, wherein contents of said second bank are altered by executing a loader program held in said first bank.
6. The system according to claim 5, wherein contents of the first bank are altered by executing a loader program held in said second bank.
7. The system according to claim 6, wherein the loader programs held in said first and second banks are identical.
8. The system according to claim 7, wherein the loader program held in said second bank is generated by copying the loader program held in said first bank.
9. The system according to claim 7, wherein the loader programs held in said first and second banks can be copied to each other.
10. The system according to claim 2, wherein said camera further comprises connection means for connecting an external device, and data held in said external device is written in said flash memory by executing the control program.
11. The system according to claim 10, wherein said external device holds a program for making said camera compatible with said external apparatus, and the program held in said external device is written in said flash memory by executing the control program.
12. The system according to claim 11, wherein said external device is a camera accessory.
13. A memory alteration system for a camera which comprises first storage means and a re-bootable EEPROM, wherein said first storage means holds a control program for altering contents thereof, and

the contents of all areas of said first storage means are altered by copying the control program to said re-bootable EEPROM and executing the copies control program.

14. The system according to claim 13, wherein said first storage means comprises a flash memory.

15. The system according to claim 14, wherein said camera further comprises connection means for connecting an external device, and data held in said external device is written in said flash memory by executing the control program.

16. The system according to claim 15, wherein said external device holds a program for making said camera compatible with said external apparatus, and the program held in said external device is written in said flash memory by executing the control program.

17. The system according to claim 16, wherein said external device is a camera accessory.

18. The system according to claim 13, wherein said control program is copied to a work area of said re-bootable EEPROM.

19. The system according to claim 18, wherein said work area is a temporary storage area for status setup values of the camera.

20. The system according to claim 13, wherein said re-bootable EEPROM comprises a terminal for re-booting.

21. A memory alteration method for a camera which comprises storage means divided into at least first and second areas, wherein said first and second areas respectively are able to hold a control program for altering contents of said storage means, contents of said second area are altered by executing the control program held in the first area, and contents of said first area are altered by executing the control program held in the second area.

22. The method according to claim 21, wherein said storage means comprises a flash memory, which has a plurality of banks including first and second banks.

23. The method according to claim 22, wherein the control program is a loader program for controlling rewrite of said flash memory.

24. The method according to claim 23, wherein the loader programs held in said first and second banks are identical.

25. The method according to claim 24, wherein the loader program held in said second bank is generated by copying the loader program held in said first bank.

26. The method according to claim 24, wherein the loader programs held in said first and second banks can be copied to each other.

27. The method according to claim 22, wherein said camera further comprises connection means for connecting an external device, and data held in said external device is written in said flash memory by executing the control program.

28. The method according to claim 27, wherein said external device holds a program for making said camera compatible with said external apparatus, and the program held in said external device is written in said flash memory by executing the control program.

29. The method according to claim 28, wherein said external device is a camera accessory.

30. A memory alteration method for a camera which comprises first storage means and a re-bootable EEPROM, wherein said first storage means holds a control program for altering contents thereof, and copies the control program to said re-bootable EEPROM, alteration control of said first storage means is passed to the control program copied to said re-bootable EEPROM, and the contents of all areas of said first storage means are altered by the copied control program.

31. The method according to claim 30, wherein said first storage means comprises a flash memory.

32. The method according to claim 31, wherein said camera further comprises connection means for connecting an external device, and data held in said external device is written in said flash memory by executing the control program.

33. The method according to claim 32, wherein said external device holds a program for making said camera compatible with said external apparatus, and the program held in said external device is written in said flash memory by executing the control program.

34. The method according to claim 33, wherein said external device is a camera

accessory.

35. The method according to claim 30, wherein said control program is copied to a work area of said re-bootable EEPROM.

36. The method according to claim 35, said work area is a temporary storage area for status setup values of the camera.

37. The method according to claim 30, wherein said re-bootable EEPROM comprises a terminal for re-booting.

38. A camera comprising:

storage means divided into at least two areas, wherein the at least two areas of said storage means respectively are able to hold a control program for altering contents of said storage means, and when the control program held in a first area is executed to alter the contents of a second area to a predetermined control program then altering said first area using said predetermined control program of said second area, the contents of all the areas of said storage means are altered.

39. The camera according to claim 38, wherein said storage means comprises a flash memory, which has a plurality of banks including first and second banks.

40. The camera according to claim 39, further comprising connection means for connecting an external device, and wherein data held in said external device is written in said flash memory by executing the control program.

41. A camera comprising:

first storage means and a re-bootable EEPROM, wherein said first storage means holds a control program for altering contents thereof, and the contents of all areas of said first storage means are altered by copying the control program to said re-bootable EEPROM and executing the copied control program.

42. The camera according to claim 41, wherein said first storage means comprises a flash memory.

43. The camera according to claim 42, further comprising connection means for connecting an external device, and wherein data held in said external device is written in said flash memory by executing the control program.

44. The camera according to claim 41, wherein said control program is copied to a work area of said re-bootable EEPROM.

45. The camera according to claim 44, wherein said work area is a temporary storage area for status setup values of the camera.

46. The camera according to claim 41, wherein said re-bootable EEPROM comprises a terminal for re-booting.

47. A recording medium which records a program code for memory alteration in a camera which comprises storage means divided into at least first and second areas the respectively are able to hold a control program for altering contents of said storage means, said program code including: a code of altering contents of said second area by executing the control program held in said first area, and a code of altering contents of said first area by executing the control program held in said second area.

48. A recording medium which records a program code for memory alteration in a camera which comprises first storage means and re-bootable EEPROM, and in which said first storage means holds a control program for altering contents thereof, said program code including:

a code of copying the control program to said re-bootable EEPROM; a code of passing alteration control of said first storage means to the control program copied to said re-bootable EEPROM; and a code of altering contents of all areas of said first storage means by executing the copied control program.

49. The recording medium according to claim 48, wherein said control program is copied to a work area of said re-bootable EEPROM.

50. The recording medium according to claim 49, wherein said work area is a temporary storage area for status setup values of the camera.

51. The recording medium according to claim 48, wherein said re-bootable EEPROM comprises a terminal for re-booting.

three accelerometers for respectively sensing said linear movement of said camera along three orthogonal axes, and at least three gyroscopes for respectively sensing said rotational movement of said camera about three orthogonal axes.

31. The system of claim 26 wherein said wireless communication device also transmits data relating to an operating parameter of said camera, together with said position-related data.

32. The system of claim 31 wherein said operating parameter is the focal length of a lens on the camera.

33. The system of claim 31 wherein said operating parameter is the focal distance.

34. The system of claim 31 wherein said operating parameter is an aperture value for the camera.

35. The system of claim 31 wherein said operating parameter is temperature.

36. The system of claim 26, further including an SMPTE time code generator, and wherein said wireless communication device transmits the time code associated with the output signals from said inertial sensors.

37. The system of claim 30 comprising at least two inertial sensors for each of said directions of movement along and about said axes.

38. The system of claim 37 wherein the two sensors for sensing a given direction of movement are of the same type, and said information is based on an average of their respective output signals.

39. The system of claim 37 wherein the two sensors for sensing a direction of movement are of different types.

40. A camera position and orientation tracking system, comprising:

a camera having a plurality of inertial sensors which respectively generate output signals indicative of movement of the camera in six directions of movement;

a time code generator which generates an output signal indicative of a running time code;

a processing unit which processes the output signals generated by said inertial sensors and said time code generator to compose packets of data which define the instantaneous location and orientation of the camera and the time code associated with each instance of data;

a wireless communication device for transmitting said packets of data to a remote site; and

a memory unit at said remote site for storing said position information and associated time code data.

41. The system of claim 40 wherein said time code generator is located in said camera.